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Canadian and U.S. Real Income Growth Pre and Post 2000: A Reversal of Fortunes

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Abstract

Evaluations of an economy's economic performance are often made using a measure of real gross domestic product (GDP) per capita, which represents the average remuneration (labour income plus capital services) that an economy generates through domestic production.

Because real GDP is a constant dollar measure of the remuneration to capital and labour in an economy, it does not account for who owns the capital, how much of it is used up through production or how relative price shifts affect the volume of goods and services that can be purchased.

Modifications can be made to traditional estimates of GDP to account for these factors. This paper examines the performance of the Canadian economy using alternate measures—gross domestic income, gross national income and net national income. The paper also examines the relative performance of the Canadian and U.S. economies using standard GDP measures and these alternate measures.

The comparison spans the period from 1980 to 2006, but focuses on the 2002-to-2006 period. During these latter years, changes in commodity prices, manufactured goods prices, the exchange rate, international investment income and capital consumption have all contributed importantly to real income growth in Canada.

As a result, a very different picture of relative performance of the Canadian and U.S. economies emerges when an aggregate income measure is used that accounts for relative price changes, international income flows and capital consumption than when real GDP is used. From 2002 to 2006, U.S. real GDP per capita grew 9.3% while Canadian GDP per capita rose 7.0%, making it appear that the U.S. economy was outperforming the Canadian economy. However, once changes in resource prices and the exchange rate, international investment income and capital consumption are taken into account, real income per capita in the United States increased by 8.6%, which is similar to its GDP per capita growth. However, the Canadian adjusted measure of real income per capita growth rose 15.6%, more than twice the per capita real GDP growth in Canada and nearly double the U.S. rate.

In contrast, the difference between the two economies was exactly the opposite in the period from 1980 to 2000—when commodity prices were falling, when the exchange rate was not appreciating and when outward flows of income to foreigners were increasing relative to the income paid to Canadians. During this period, when consideration is given to these factors, real income measures in Canada were falling relative to those in the United States.

Keywords: balance of international payments; gross domestic product; income and expenditure accounts; international investment; terms of trade

Executive summary

The performance of the Canadian economy relative to its U.S. counterpart has received considerable attention from the analyst community. And most of the time, these evaluations make use of summary statistics like gross domestic product (GDP) or productivity (GDP per hour worked) to analyse differences in performance.

Both of these measures capture in succinct form the myriad of events that affect the domestic income that the economy is creating by transforming labour and capital into output. As such, they provide a useful summary of what is happening to the income that is being generated by domestic production.

Data from the National Accounts can also be used to evaluate other concepts of income—concepts that take into account changes in the potential purchasing power of income that occur from relative price shifts, the income that flows to or from abroad because of international investment and the capital that is consumed during the production process and must be replaced if standards of living are to be maintained. These real income measures are referred to, respectively, as real gross domestic income (GDI), real gross national income (GNI), and real net national income (NNI).

These measures receive less attention than GDP-based measures. For many purposes, GDP-based measures may be adequate—because the measures are often similar in the short run. However, ignoring differences in these measures can hide important long-term trends and one could sometimes miss important changes in direction.

This paper demonstrates just how important divergences between these measures have been over the last 25 years—and how they can modify our interpretation of events.

In the period before 2000, all of the measures indicate a long-term decline in the relative performance of the Canadian economy—though the various real income measures decline more than the production-based GDP measure, especially in the 1980s. These were years in which the resource economy in Canada was in decline. Resource inputs as a percentage of GDP were falling around the world. Relative commodity prices were declining. Increases in the amounts that were being remitted abroad from Canada were less than increases in payments that were being received from abroad. As a result, the various income measures actually declined more than GDP.

All that has changed with the commodity boom that Canada experienced after 2000. Prices of exports have increased sharply, relative to the prices of imports. Canadian receipts of income from abroad have increased dramatically, relative to payments abroad. The concatenation of these events—coupled with China and India emerging as important players in the world economy—has led to a dramatic increase in real income growth in Canada relative to GDP growth. And this has also affected Canada–United States comparisons. Canada had a strong terms-of-trade improvement from 2002 to 2006 due to rising commodity prices, an appreciating currency and falling world prices for manufactured goods that contributed greatly to real income growth. The U.S. measures of real income were much less affected by these factors.

From 2002 to 2006, U.S. real GDP per capita grew 9.3% while Canadian GDP per capita rose 7.0%, making it appear that the U.S. economy was outperforming the Canadian economy. Once changes in resource prices and the exchange rate, international investment income and capital consumption are accounted for, real income per capita in the United States increased by 8.6%, which was similar to its GDP per capita growth. However, the Canadian measure of real income per capita rose 15.6%, more than twice the per capita real GDP growth in Canada and nearly double the U.S. rate.

As a result, comparisons of the relative per capita performance of the two countries hinge crucially on whether or not the terms of trade and international income flows are incorporated into the analysis. If the terms of trade are excluded, and relative real GDP per capita growth (or relative productivity growth) is the focus, Canada appears to have been performing worse than the United States from 2002 to 2006. If, however, the impact of the terms of trade, international income flows and depreciation are included in the analysis, Canada fared much better. In fact, its growth outperformed the United States by as much as 7.0 percentage points from 2002 to 2006.

The long downward trend in Canada's fortunes versus its American partner has reversed in very short order. After 2000, real income levels returned to levels not seen since the mid-1980s. And much of this has been due to the much maligned resource economy. Studies of the Canadian economy in the late 1990s often emphasized that the salvation of the Canadian economy lay in high-tech growth in the manufacturing sector—partly because of the high rates of growth in this sector in the United States, partly because the prices of the commodities provided by the resource sector seemed to be in secular decline.

The performance of the post-2000 Canadian economy has shown the advantages of having a diversified economy with a not insignificant resource base. A diversified economy has some of the same advantages as a diversified stock portfolio. Some sectors may decline slowly for long periods of time—only to experience a dramatic change in fortunes. Canada has had just such an experience.

1. *Introduction*

Relative income comparisons between Canada and the United States are generally interpreted as stating something about the difference in living standards between the two countries. When in one country income grows faster than in the other that country is viewed as performing 'better' than the other.

Often the comparison is made using a relative measure of real gross domestic product (GDP) per capita, which represents an inflation-adjusted measure of the average earnings—labour income plus capital services—in terms of output produced. Over time, productivity improvements increase real GDP per capita by improving the efficiency of the domestic production process and translate into higher living standards. Higher employment levels or more hours worked also lead to higher GDP per capita, but at the expense of less leisure. Cross-country comparisons, therefore, often focus on relative productivity growth (see Maynard 2007 or Baldwin and Gu 2007 for examples).

While productivity growth is an important determinant of long-run living standards, a number of additional factors can also be important. Because real GDP is a constant dollar measure of the remuneration to capital and labour in an economy, it does not account for who owns the capital, how much of it is used up through production or how relative price shifts affect the volume of goods and services that can be purchased. An economy may improve the efficiency with which it produces goods and services. However, if it produces goods whose prices are falling relative to the goods it purchases, or if it increasingly remits more and more income to foreign owners of capital, it may not see much of an increase in its standard of living as measured by the purchasing power of the real income of its citizens.

Measures of output produced in a country are not identical to income received by residents if part of the income is transmitted abroad. Measures of output calculated gross of capital consumed do not reflect what is available for consumption if the capital stock is to be maintained. Measures of real income earned are not synonymous with what can be purchased in a world where export sales contribute to the financing of imports.

Modifications can be made to traditional estimates of GDP to account for these factors. This paper examines the relative performance of the Canadian and U.S. economies after having done so. The comparison spans from 1980 to 2006, but focuses on the 2002-to-2006 period. During these latter years, changes in commodity prices, manufactured goods prices, the exchange rate, international investment income and capital consumption have all contributed importantly to real per capita income growth in Canada.

In Canada, rising commodity prices and falling prices for manufactured imports have increased the volume of goods that Canadians can purchase abroad. The appreciation of the dollar has leveraged these gains, contributing to higher real income growth through increased purchases of foreign goods such as consumer products and machinery and equipment.

Real income received by Canadians has also benefited from a more favourable net international investment position. From 2000 to 2006, Canadian foreign direct investment (FDI) averaged

$49.3 billion a year while Canadian foreign portfolio investment averaged $43.7 billion. Inbound FDI and portfolio investment were substantially lower, averaging $42.9 and $26.8 billion, respectively. The result has been a net increase in Canadian investment abroad and less net income sent abroad each year.

A decrease in real capital consumption also contributes to real income growth in Canada. Also, because trade and international income flows are more important for national income after adjusting for capital consumption, the adjustment magnifies the impact of the price changes and net foreign income gains.

The same influences have had much different, more muted, impacts on the United States. Unlike Canada, rising commodity prices, particularly for energy, have reduced U.S. real income growth relative to its GDP growth because it is a net importer of commodities. Also, because the United States derives a smaller percentage of its GDP from exporting and importing than does Canada, the influence of commodity price changes on real income growth has been smaller. The contribution of international income flows has also had a more muted impact in the United States because it is a relatively closed economy. Only modifications of standard GDP per capita measures for capital consumption noticeably affect estimates of real income growth in the United States.

As a result, a very different picture of relative performance of the Canadian and U.S. economies emerges when an aggregate income measure is used that accounts for relative price changes, international income flows and capital consumption than when real GDP is used. From 2002 to 2006, U.S. real GDP per capita grew 9.3% while Canadian GDP per capita rose 7.0%, making it appear that the U.S. economy was outperforming that of Canada. Once changes in resource prices and the exchange rate, international investment income and capital consumption are accounted for, real income per capita in the United States increased by 8.6%, which is similar to its GDP per capita growth. However, the Canadian adjusted measure of real income per capita rose 15.6%, more than twice the per capita real GDP growth in Canada and nearly double the U.S. rate.

In contrast, the difference between the two economies was exactly the opposite in the period from 1980 to 2000—when commodity prices were falling in real terms, when the exchange rate tended to depreciate and when outward flows of income to foreigners were increasing relative to the income paid to Canadians. During this period, when consideration is given to these factors, real income measures in Canada were falling relative to those in the United States.

This paper examines the relative importance of the different factors that contribute to this difference. It is organized as follows: Section 2 discusses the real income measures and how they relate to each other, as well as the data employed; Section 3 analyses the Canadian and U.S. real aggregate income measures; Section 4 provides a per capita growth comparison; and Section 5 concludes.

2. *Methodology and data*

The income measures employed here stem from the widely recognized, but often neglected, relationship between production and income measures outlined in the 1993 System of National Accounts (SNA 1993). The SNA 1993 outlines how income measures based solely on income earned through production—gross domestic product (GDP)—and income measures that are broader in scope relate to each other. The more broadly defined income measures account for international income flows, capital consumption and the purchasing power of earnings. Each of the income measures used in this paper, and their relationships to GDP, are described below. When the different income measures are analysed, they are initially calculated separately for the Canadian and the U.S. economies so that the differing importance of each factor for each economy can be illustrated.

2.1 The different income measures

An economy is designed to take the resources of a country—the land, minerals, timber, labour, capital, etc.—and turn them into goods and services that its citizens demand. There are two ways the transformation is accomplished. The first is by domestic production. The second is by exporting goods and importing other goods—the export–import channel. By recognizing that capital and labour remuneration, ownership structure and capital depreciation affect the real value of domestic production that the domestic population retains, and that changes in export and import prices can affect the volume of imports that can be purchased with a given amount of exports, it is possible to analyse how these different channels influence real income growth.[1]

The starting point for analysis is real GDP, which is an inflation-adjusted measure of a country's value added, or remuneration to capital and labour utilized in the production of a country's goods and services (Figure 1). It captures the real gross income obtained through domestic production. Changes in real GDP capture gross changes in the amount of labour and capital employed and changes in productivity.

When the concept of income is widened to include changes in the purchasing power of earned income, the relevant measure is real gross domestic income (GDI). Changes in purchasing power come from changes in relative prices, particularly the terms of trade. The change in purchasing power that arises from relative price movements is called a trading gain, which, when added to real GDP, creates the real GDI measure. The inclusion of trading gains provides a more complete income measure for a small open economy like that of Canada.

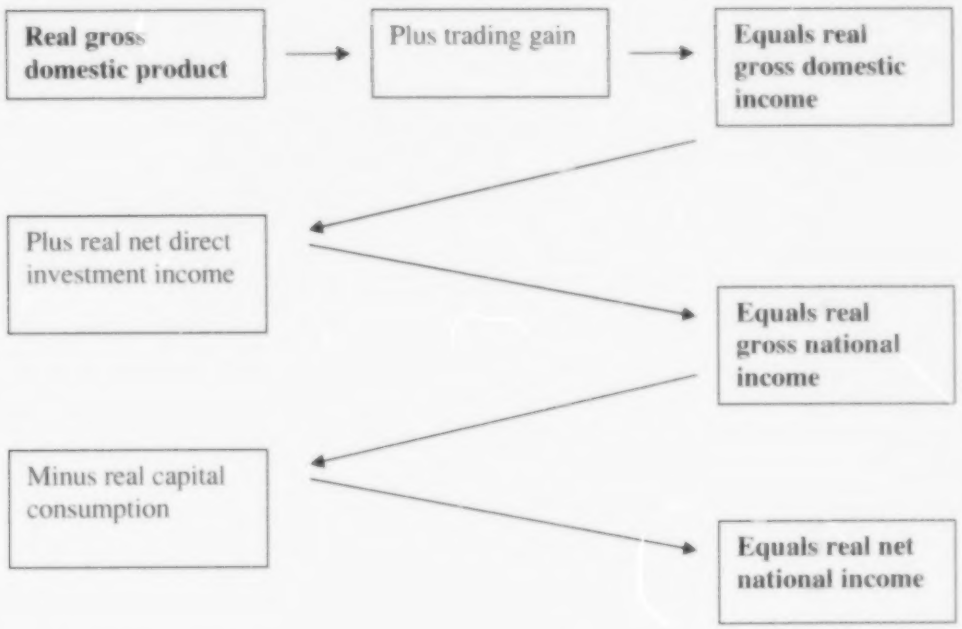
Real GDI is a constant dollar measure of the purchasing power of income generated in Canada. However, Canadians have assets abroad and foreigners have assets in Canada. As a result, not all

1. Throughout the paper only the real values of the different income measures are analysed. This is done for a specific purpose. The trading gain that an economy realizes can only be illustrated in real terms because it is derived from relative price changes. In nominal terms gross domestic product and gross domestic income (or gross national product and gross national income or net national product and net national income) are identical because they reflect both prices and quantities. The trading gain is derived from a relative price movement that offsets changes in relative prices with potential volume movements. It, therefore, cannot be isolated using a nominal income measure.

of the income earned in Canada accrues to Canadians, and some of the income earned in other countries is owed to Canadians. When these international income flows are combined with real GDI the resultant real income aggregate is real gross national income (GNI). Because net international income payments tend to be relatively small, real GDI growth and real GNI growth are usually, but not always, similar.

Finally, including capital depreciation leads to real net national income (NNI). Real NNI captures the purchasing power of real income retained by residents of Canada after they have replaced worn out and obsolete physical capital. It is the purchasing power of adjusted real income distributed to Canadians after ensuring the maintenance of the capital stock of machinery and equipment, buildings and infrastructure.

Figure 1


Real gross domestic product
Plus trading gain
Equals real gross domestic income
Plus real net direct investment income
Equals real gross national income
Minus real capital consumption
Equals real net national income

Source: Statistics Canada.

The relationship between real GDP, real GDI, real GNI and real NNI is discussed in greater detail below. Additional analysis about what has led to changes in trading gains, international investment and depreciation is provided. The discussion follows the process laid out in Figure 1.

2.1.1 Trading gains

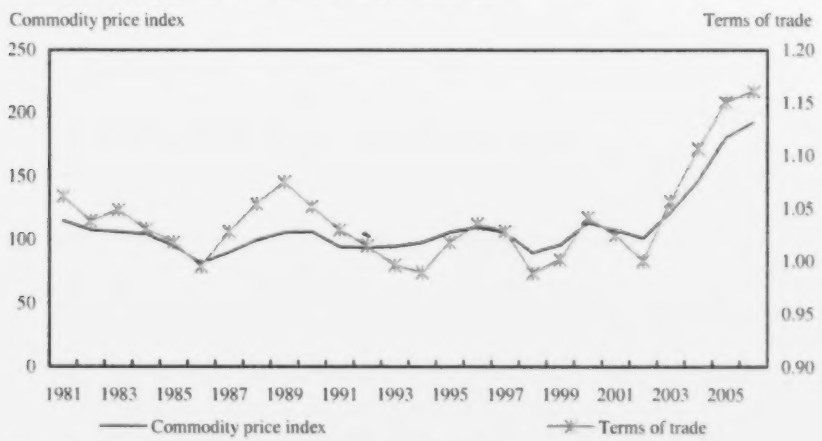
The difference between real GDP and real GDI stems from the scope of the income concept employed. Real GDP is a measure of the income earned through production while real GDI represents the purchasing power of that income. To account for changes in purchasing power, real GDI combines real GDP and purchasing power changes called trading gains. Trading gains

arise when relative prices change. They capture the impact of changes in the relative price of exports and imports—the terms of trade—and the change in the relative price of traded to non-traded goods and services (Macdonald 2007, Kohli 2006, 2004).

Since economic theory and statistical practice dictate that nominal GDP and nominal GDI are equal, the difference between real GDP and real GDI is determined by their respective deflators. The GDP deflator is designed to adjust to account for all change in prices, regardless of their source. As a result, when final domestic demand, export or import prices change there is an accompanying change in the GDP deflator. The GDP deflator, therefore, treats terms-of-trade changes as price phenomena.

The GDI deflator, on the other hand, does not adjust to account for all price fluctuations. In doing so, it allows relative price changes to affect the number of traded goods and services that may be purchased. The GDI deflator achieves this by using the same price index for exports and imports. This approach is equivalent to deflating net exports rather than exports and imports separately. By deflating net exports the GDI deflator does not remove changes in purchasing power that originate from relative price shifts. Rather than measuring the volume of exports and imports leaving and entering an economy, the GDI deflator captures changes in the volume of imports that can be purchased with a given volume of exports.

Figure 2
Commodity prices and the terms of trade

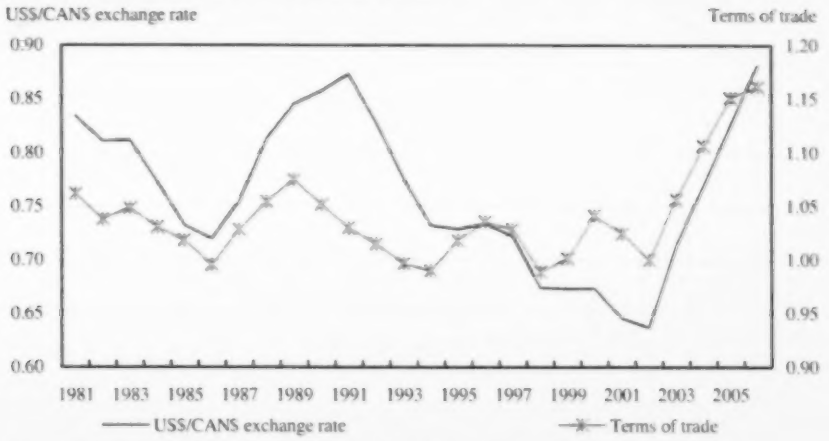


Note: Some results have been calculated by the author.
Source: Statistics Canada, CANSIM tables 176-0001 and 380-0002.

For Canada, changes in the terms of trade are the most important contributor to trading gains (Macdonald 2007). The terms of trade denote the number of imports that can be purchased with exports. When the price of exports rises, or the price of import falls, Canada is able to purchase more imports with the same volume of exports and domestic expenditures can potentially increase. This process produces gains in the purchasing power of income—gains that are just as

real as those produced by productivity growth since Canada can consume more goods and services from its resource base after a terms-of-trade increase.[2]

Figure 3
Exchange rate and the terms of trade



Note: Some results have been calculated by the author.
Source: Statistics Canada, CANSIM tables 176-0049 and 380-0002.

Canada's terms of trade are primarily influenced by commodity prices, the U.S.–Canadian dollar exchange rate and world manufactured goods prices (Figures 2 and 3).[3] These prices have changed rapidly after 2002, leading to trading gains that have contributed significantly to real income in the post-2002 period. The terms of trade that fluctuated around a narrow band in the period prior to 2002 have increased dramatically by over 15% after 2003 as commodity prices and the exchange rate increased. Widespread commodity price increases have benefited most provinces and Canada (Macdonald 2007). During each year from 2003 to 2005, commodity prices rose by at least 20% as a worldwide economic expansion led to increased demand for inputs. The parallel appreciation of the Canadian dollar against the U.S. dollar lowered the price of many international goods and leveraged the impact of falling world manufactured goods prices. The combined influence of these changes meant Canadians earned higher incomes when they sold resources and were able to purchase more foreign goods with that income. The dramatic changes in the terms of trade imply that including trading gains in analysis of real income growth should be expected to produce quite a different result after 2002.

The impact of a change in the terms of trade on a country's real income depends crucially on the proportion of its income derived from trade (Macdonald 2007). For Canada, the average share of imports and exports varies between 27% and 50%, depending on the income measure used and the year. Trade, therefore, constitutes an important avenue for Canadian real income growth. For

2. See Diewert and Morrison 1985 for more discussion.
3. It is important to note that the changes in the Canada–United States dollar exchange rate and commodity price may not be independent of each other. Nevertheless, exchange rates can deviate from levels suggested by economic fundamentals for significant periods of time. As a result, although they are related, exchange rate fluctuations are not solely the result of commodity price movements.

the United States, however, the proportion varies between 9% and 16%. Trade is less important for U.S. real income growth, reducing the importance of the export–import channel.

When trading gains are added to real GDP growth, the subsequent measure is referred to as real gross domestic income (GDI).[4] Conceptually, the difference between real GDP and GDI is that real GDP is a constant dollar measure of a country's income while real GDI is a constant dollar measure of the domestic expenditures that income can support.

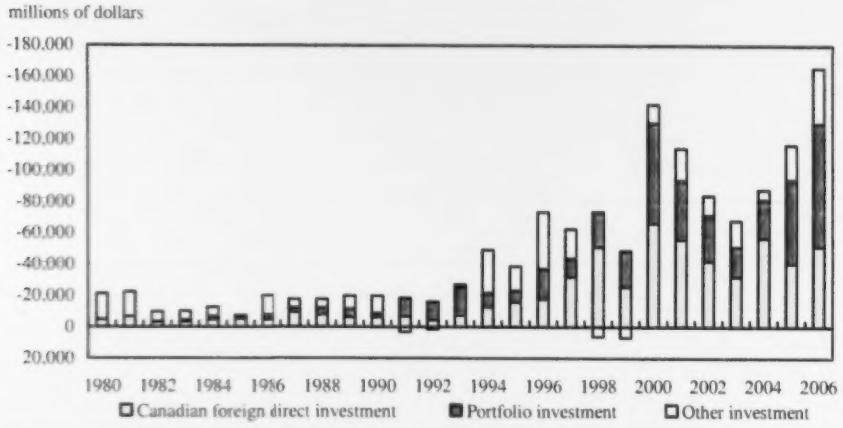
2.1.2 International income flows

International investment, both by domestic residents and by foreigners, influences the real income received by residents of a country. When domestic investors purchase assets in other countries, they receive a stream of payments from their investment. Similarly, when foreigners invest in Canada—or in the United States—their investments earn a return. When these returns are repatriated, part of the income created in Canada—or in the United States—that is included in GDP is sent abroad, and part of the income earned abroad is returned home. When these flows are netted out of real GDI, the resulting measure is known as gross national income (GNI).

International investment is functionally broken down under three broad headings: foreign direct investment (FDI); portfolio investment; and, other investments. FDI measures the value of equity, debt and re-invested earnings in foreign enterprises where the investor has a significant influence in the foreign enterprise; portfolio investment measures the value of equity and debt where the interest is non-direct and where the securities trade on organized markets; and, other investment captures predominantly non-market investments such as international bank and other loans, Government of Canada loans to other nations, or trade credits.

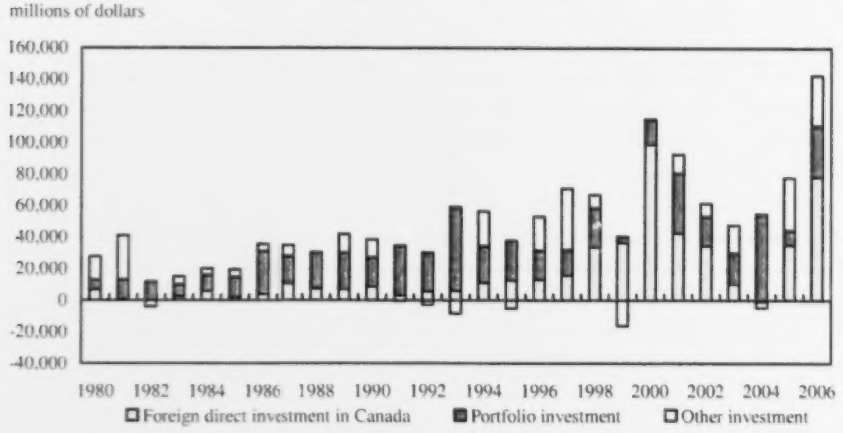
4. For a discussion of how to include trading gains in national accounts aggregates, see Section 16.154 of the 1993 System of National Accounts.

Figure 4
Net flows of Canadian financial investment, by type



Note: In the financial account of the Balance of Payments, a minus sign denotes an outflow of capital from Canada resulting from an increase in claims on non-residents or a decrease in the liabilities of non-residents.
Source: Statistics Canada, CANSIM table 376-0002.

Figure 5
Net flows of foreign investment in Canada, by type



Note: In the financial account of the Balance of Payments, a minus sign denotes an outflow of capital from Canada resulting from an increase in claims on non-residents or a decrease in the liabilities of non-residents.
Source: Statistics Canada, CANSIM table 376-0002.

During the 1980s, Canadian FDI flows were muted (Figure 4). FDI averaged $5.6 billion per year in the 1980s and made up a relatively small portion of total international investment. Portfolio investment was also small, averaging only $2.2 billion. Other non-market transactions averaged $8.1 billion and were particularly important during the recessions of the early 1980s.

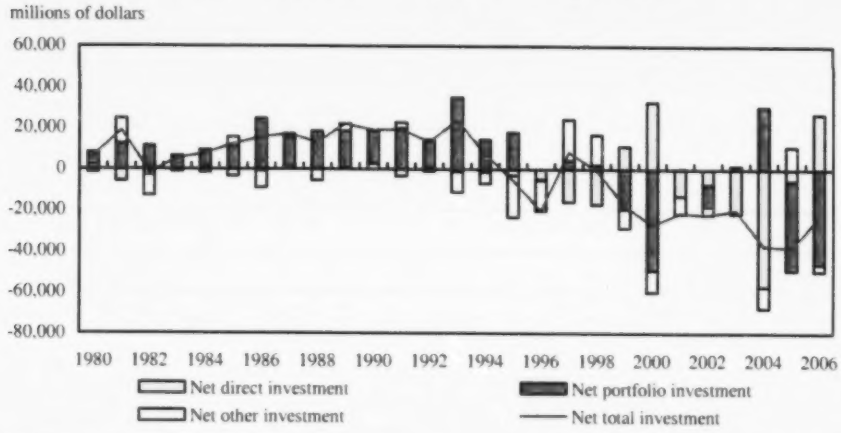
In the 1990s, Canadian portfolio investment began rising as the limit on foreign investment from pensions rose from 10% to 20% from 1990 to 1994. Portfolio investment averaged $13.7 billion per year, significantly more than during the previous decade, and reached a maximum of $23.1 billion in 1999. FDI also increased as the North American Free Trade Agreement came into effect. During the 1990s, FDI averaged $17.9 billion and reached a maximum of $50.1 billion in 1998. Other investments declined in importance, averaging $9.2 billion per year, most of which occurred from 1994 to 1997.

After 2000, Canadian international investment continued to expand, led by portfolio investment and FDI, which averaged $43.7 and $49.3 billion per year, respectively. Importantly, the 20% limit on foreign investment content for pension funds was removed in 2005, enlarging the pool of liquid assets that could be invested abroad. At around the same time, the market for Maple bonds matured as foreigners began issuing more debt in Canadian dollars, allowing investors a claim on foreign earnings without any exchange rate risk. Other investments doubled on average to $17.8 billion. Following setbacks in the early 2000s as the tech bubble collapsed and the United States entered a period of reduced economic growth, portfolio investment expanded rapidly. FDI also expanded after 2002. Regardless of the type of flow, foreign investment by Canadians is substantially higher after 2000 than it was in the 1980s or early 1990s.

By contrast, foreign investment in Canada has not increased at the same rate as Canadian investment outside Canada (Figure 5). Despite important flows of other investments during the recession of the early 1980s, FDI in Canada stayed below $16 billion per year until 1997. From 1986 to 2000, foreign investment flow fluctuations were predominantly the result of differing portfolio investment flows and other investments. FDI into Canada was stable for most of the late 1980s and early 1990s. Beginning in the mid-1990s, the federal government reduced expenditures and began the process of resolving the fiscal deficit. After 1998, and continuing into the post-2000 years, a potentially important feature holding back foreign investment growth has come from the smaller pool of federal government debt. Moreover, the federal government has been reducing its holdings of foreign debt at a faster rate than its holdings of Canadian debt, further hindering the foreign investment growth in Canada (Cross 2004). In the late 1990s, FDI rose rapidly during the technology boom, before declining rapidly during the technology industry collapse and subsequent U.S. recession. In 2004, FDI into Canada was nearly zero. Nevertheless, foreign investment in Canada after 1999 tends to be higher than the previous two decades.

Despite increased foreign investment flows into Canada, the total inflow of foreign investment has been lower than the outflow of Canadian investment since 1994 (Figure 6). Prior to 1994, foreign investment in Canada tended to be around $20 billion larger than Canadian investment abroad due primarily to higher foreign portfolio investment. After 1994, however, Canadian investments abroad increased relative to foreign investment in Canada as foreign-content restrictions were eased and national savings increased as the federal government went from a deficit to a surplus position and corporate savings rose.

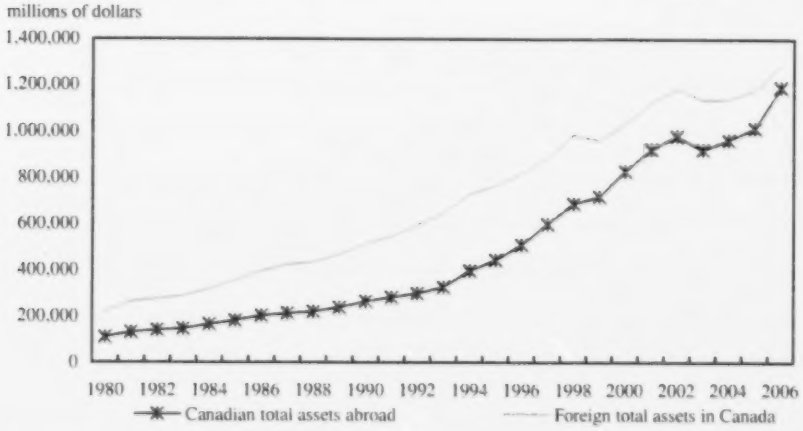
Figure 6
Net financial investment in Canada, total and by source



Note: In the financial account of the Balance of Payments, a minus sign denotes an outflow of capital from Canada resulting from an increase in claims on non-residents or a decrease in the liabilities of non-residents.
Source: Statistics Canada, CANSIM table 376-0002.

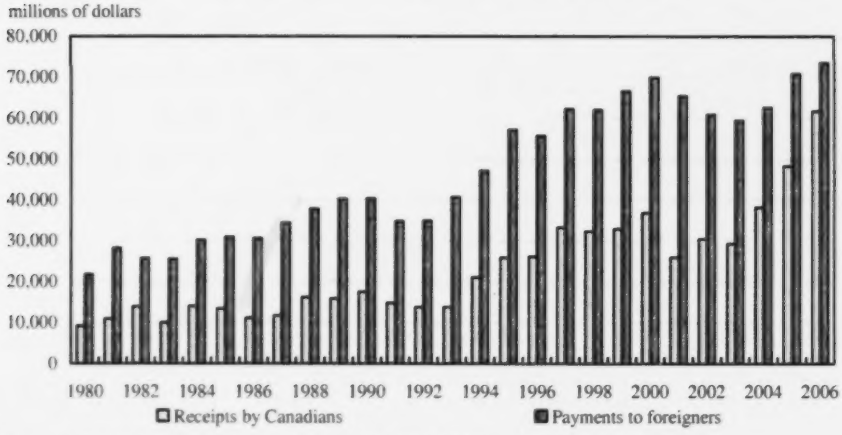
As a result of the higher net investment abroad by Canadians, the stock of Canadian investments abroad has grown faster than the stock of foreign investments in Canada (Figure 7). Beginning in 1994, and accelerating towards 2006, the gap between the stock of Canadian investments abroad and foreign investments in Canada has been shrinking.

Figure 7
Investment stocks



Source: Statistics Canada, CANSIM table 376-0037.

Figure 8
Canadian international investment income and payments



Source: Statistics Canada, CANSIM table 376-0001.

Table 1
Investment income by source

	2000	2001	2002	2003	2004	2005	2006
				millions of dollars			
Receipts							
Investment income	36,755	25,990	30,502	29,253	38,169	48,213	61,599
Direct	15,090	6,391	13,766	13,706	21,253	26,017	32,600
Portfolio	7,189	8,070	8,859	8,654	10,070	12,380	16,867
Other	14,476	11,529	7,877	6,893	6,846	9,816	12,131
Payments							
Investment income	69,863	65,320	60,799	59,284	62,468	70,735	73,446
Direct	24,477	22,266	21,529	23,765	27,652	34,212	31,091
Portfolio	29,838	30,668	30,804	28,816	27,968	27,897	27,094
Other	15,548	12,386	8,466	6,702	6,849	8,625	15,260
Balance							
Investment income	-33,108	-39,330	-30,297	-30,031	-24,299	-22,522	-11,847
Direct	-9,387	-15,875	-7,763	-10,059	-6,399	-8,195	1,509
Portfolio	-22,649	-22,598	-21,945	-20,162	-17,898	-15,517	-10,227
Other	-1,072	-857	-589	191	-3	1,191	-3,129

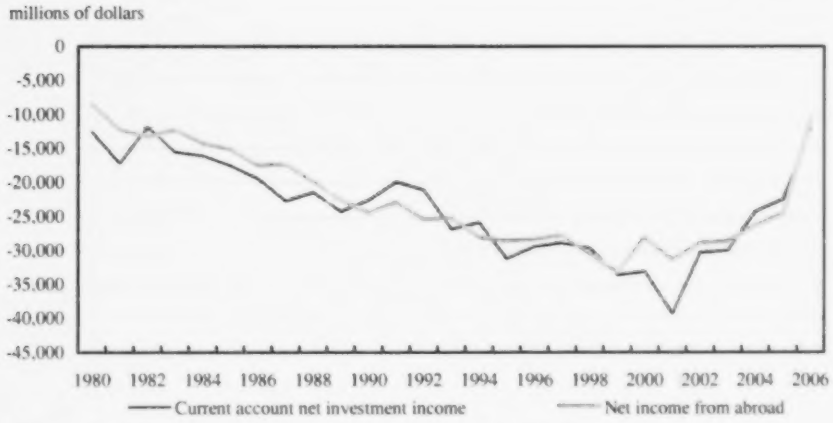
Source: Statistics Canada, CANSIM table 376-0001.

Although the stock of Canadian investment abroad has increased more quickly than the stock of foreign investment in Canada, the income flow earned on those investments did not increase dramatically, relative to the income being remitted abroad, until the 2000s (Figure 8 and Table 1). From 1980 to 2001, the amount being remitted abroad each year was increasing faster than the income being returned to Canada—that is, the balance on foreign investment income tended to decline each year, reaching a low of $39.3 billion. After 2001, however, the income earned abroad by Canadian investments accelerated sharply, while the return on foreign investments rose at a slower rate. From 2002 to 2006, Canadian foreign investment income more than doubled, rising from $30.5 billion to $61.6 billion. By contrast, the investment earned by foreigners on investments in Canada rose from $60.8 to $73.4 billion from 2002 to 2006.

The current account balance on investment income provides an overview of how international income payments change over time. They provide a breakdown of net international income by source and provide valuable information about what is driving changes in Canada's net international income flows. However, for the purposes of calculating GNI, their scope is too wide.

To calculate GNI, only direct payments of primary income to labour, taxes and subsidies on production or imports and property incomes net of land rents are used.[5] The international portion of these payments is often referred to as 'net income from abroad.' The net income from abroad is closely related to the net international investment income from the current account (Figure 9). However, net international investment income payments must be adjusted for re-invested earnings and the value of international financial intermediation. The resulting series that is used to calculate real GNI consists of primary incomes such as interest and dividend payments.

Figure 9
Net Canadian international investment income and net income from abroad



Source: Statistics Canada, CANSIM tables 380-0030 and 376-0001.

5. See Sections 7.15 and 7.16 of the 1993 System of National Accounts.

From 1980 to 1999, net income from abroad tended to decline each year, despite the increase in the relative stocks of Canadian and foreign-owned assets in the mid-1990s, reaching a low of $33.2 billion in 1999. It then turned around and increased until the end of the period, which likely reflects compositional differences between Canadian and foreign investments and relative changes in interest rates. Both sets of estimates show an improving international investment flow for Canada in the later years of the sample with a substantial reduction in the net flow from 2005 to 2006, when net income from abroad improved to -$10.8 billion in 2006 from -$22.5 billion the previous year.

Over the last 27 years, Canada's net income from abroad has experienced a dramatic change going from a situation where the negative balance was increasing slowly to one where its trend has completely reversed and begun to rapidly move back to zero. The speed of recent reversal, particularly from 2005 to 2006, means that GNI rose more rapidly than GDP from 2002 to 2006.

2.1.3 Depreciation of the capital stock

The production process also leads to a reduction in the physical capital stock—machinery and equipment, buildings and infrastructure—through wear and tear, accidents and obsolescence. If there was no re-investment, this capital stock would be worn down over time and living standards would eventually fall. By adjusting real GNI for the real consumption of fixed capital, a measure of real net national income (NNI) is created. Real NNI represents the income that remains for Canadians after they have paid to replace the capital lost through production.[6]

It is important to note, however, that capital consumption is only part of the reduction in fixed stocks that is occurring. The production process also extracts non-renewable resources for use. The depreciation of fixed capital does not capture the depletion of resources that results from production. As such, the depreciation concept employed for calculating real NNI is only a partial measure. Currently, this partial measure is officially used for calculating real NNI. Nevertheless, the incorporation of depletion in future analysis would provide valuable insight for a resource-rich country such as Canada.

2.1.4 Data sources and presentation

Data for Canadian real income measures are taken from the National Income and Expenditure Accounts found on Statistics Canada's CANSIM database. The U.S. data come from the Bureau of Economic Analysis (BEA) National Income and Product Accounts.

For each country, the real GDI, GNI and NNI income measures are calculated by deflating nominal GDP, GNI and NNI by the final domestic demand price deflator. The year-over-year growth of these terms of trade-adjusted real income statistics are shown, along with their contributions to growth from their respective components. The contributions to growth calculations are made using a Tornqvist index. Figure 10 divides real GDI growth into the

6. Importantly, the United States includes defence expenditure depreciation in its estimate of capital depreciation, which Canada does not do (for more information see Lal 2003). This discrepancy makes the comparison less than ideal as the scope of the two measures is not identical. However, it should be noted that the United States invests much more heavily in military items that Canada does, making it likely that the exclusion of military depreciation in Canada has a minimal impact on the cross-country comparison.

contribution from real GDP and the contribution from the trading gain. The figure depicts the contributions using a bar graph and the real GDI growth rate using a line superimposed on the bar. Figure 11 divides real GNI between the contributions from real GDP, net financial flows and trading gains in the same fashion. Figure 12 similarly divides real NNI growth into the contributions from real GDP, net financial flows, capital consumption and trading gains. Figures 13, 14 and 15 show the same breakdowns for U.S. real GDI, GNI and NNI growth, respectively.

Importantly, for each country, the real income measures are calculated in the same manner for this paper. The BEA provides a command GNP series that is similar to the real GDI series presented in this paper. For the purposes of comparison, however, the real GDI, real GNI and real NNI series employed in analysis are computed by the author.

3. *Real income growth in Canada and the United States*

3.1 Canadian real income growth

Regardless of the measure, the most important source of real income growth for Canada over long periods of time is real gross domestic product (GDP) growth. Real GDP growth comes from increased inputs such as labour, capital and productivity. For real gross domestic income (GDI), gross national income (GNI) and net national income (NNI), changes in productivity, labour and capital inputs were the key determinants for income growth from 1980 to 2006.

The importance of trading gains has varied over time. Their influence was negative in the early 1980s, turning positive later in the decade. The same pattern occurred in the 1990s. During the post-2000 period, trading gains had a larger influence. From 2002 to 2006, trading gains contributed importantly to real GDI growth as Canada's terms of trade improved (Figure 10). In 2003, trading gains had approximately the same contribution to real GDI growth as real GDP did. The trading-gain contribution continued to be large, relative to its history, in 2004 and 2005 before dropping off in 2006. As a result, cumulative real GDI growth from 2002 to 2006 was 16.8%. By contrast, real GDP grew 11.2% over the same period.

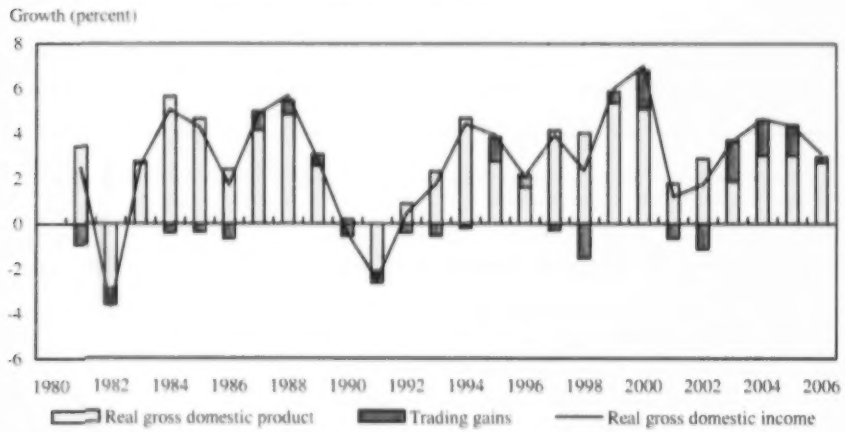
When the impact of real changes in net foreign investment income is included, there is little effect for most of the period (Figure 11). In fact, outside of specific years the contribution from net foreign investment income flows was minor. There was noticeable worsening of Canadian income growth in 1981 that was related to the recession of the early 1980s, and positive contributions in 1984 and 2000. During the latter year foreign direct investment by Canadians accelerated sharply.

The contribution from foreign investment income turned from being generally negative in the 1980s and 1990s to generally positive post 2001. The 2006 contribution to growth, which followed several years of strong FDI, was the largest in the last 27 years. The gain was due to the fact that income earned abroad by Canadian investors increased more rapidly that remittances abroad, continuing a trend that had begun in 2001. In that year the Canadian balance on net receipts of investment income reached it lowest point since 1980. Each year since 2001, the size of the net outflow has declined, with the largest reduction of $10.6 billion occurring in 2006. The

2006 reduction halved the size of the net outflow and contributed greatly to real GNI growth that year. After accounting for trading gains and net investment income flows, real GNI rose by 18.9% from 2002 to 2006 which significantly outpaced the real GDP growth rate of 11.2%.

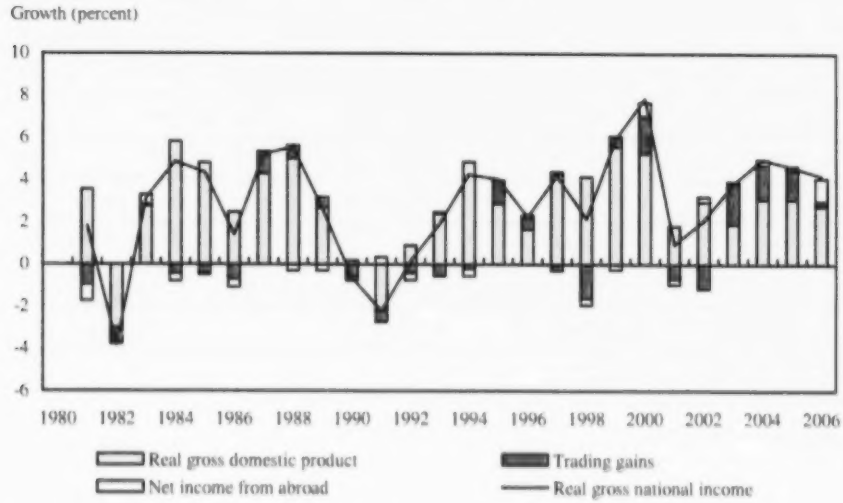
Lastly, adjusting for real capital consumption shows that for most of the last 27 years increasing levels of capital consumption reduced real income growth (Figure 12). As Canadians have invested in capital that has shorter economic life spans—such as computers, which depreciate quickly—the investment needed to maintain the real capital stock has increased. After 2002, however, the real investment required to maintain the capital stock slowed to less than 1% growth. As a result, the drag on real NNI growth from capital consumption fell to near zero, leading to a real NNI growth of 20.2% from 2002 to 2006.

Figure 10
Canadian real gross domestic income growth



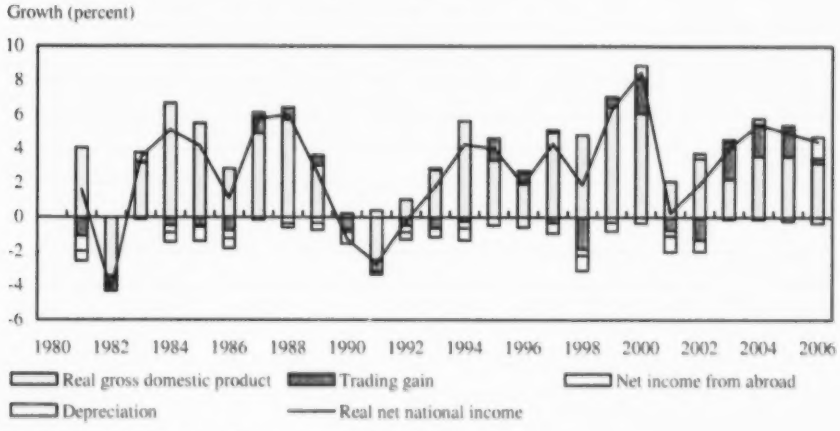
Note: Some results have been calculated by the author.
Source: Statistics Canada, CANSIM table 380-0002.

Figure 11
Canadian real gross national income growth



Note: Some results have been calculated by the author.
Source: Statistics Canada, CANSIM tables 380-0002 and 380-0030.

Figure 12
Canadian real net national income growth



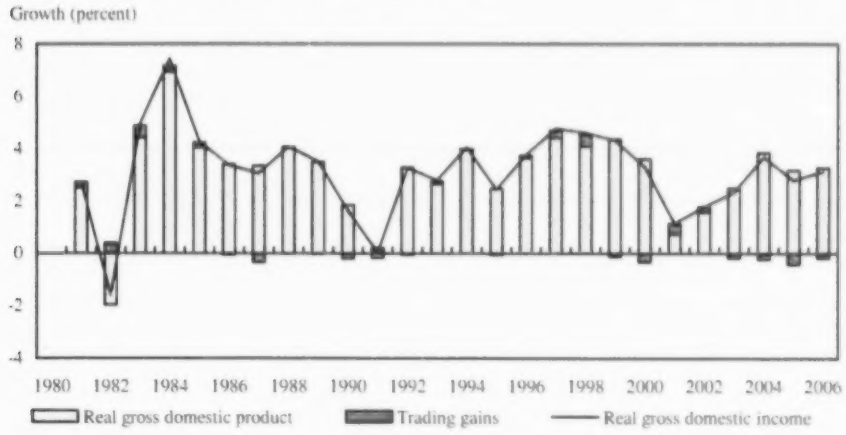
Note: Some results have been calculated by the author.
Source: Statistics Canada, CANSIM tables 380-0002 and 380-0030.

3.2 U.S. real income growth

For the United States, as for Canada, real GDP is the most important determinant of real income growth. Unlike Canada, trading gains and changes in net direct foreign investment income did not lead to significant divergences between real GDP growth and real GDI or real GNI growth (Figures 13 and 14). From 2002 to 2006, real GDP in the United States expanded by 13.6% while real GDI and GNI each increased by 12.4%.

Capital consumption influences U.S. real NNI growth to a larger extent than other factors, partly because the United States invests heavily in machinery and equipment and software, which have high depreciation rates (Figure 15). In almost every year from 1980 to 2006, higher levels of real capital consumption reduced real income growth because investment assets that are relatively short lived—such as computers and software—have increased. The only year when real capital consumption contributed to growth was 2006, which led to a smaller difference between real NNI and real GDP than between the other real income measures and real GDP. From 2002 to 2006, real NNI expanded by 12.9%, which is 0.7 percentage point lower than real GDP growth but 0.5 percentage point higher than real GDI or NNI growth.[7]

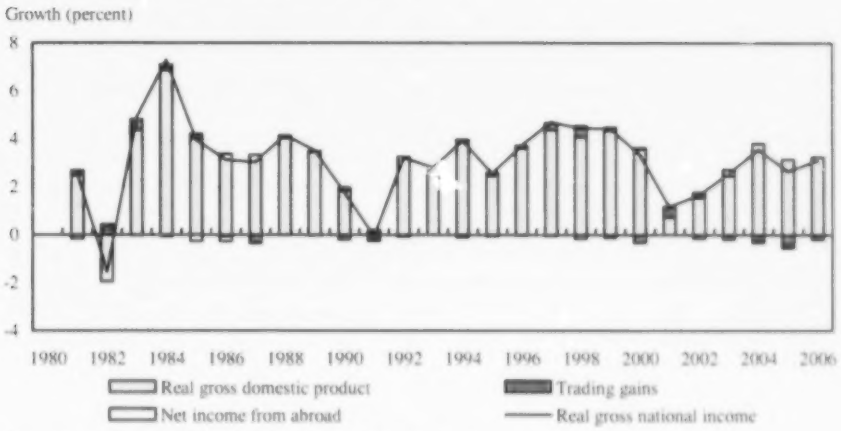
Figure 13
U.S. real gross domestic income growth



Note: Some results have been calculated by the author.
Source: Bureau of Economic Analysis, tables 1.1.5, 1.1.6 and 1.4.4.

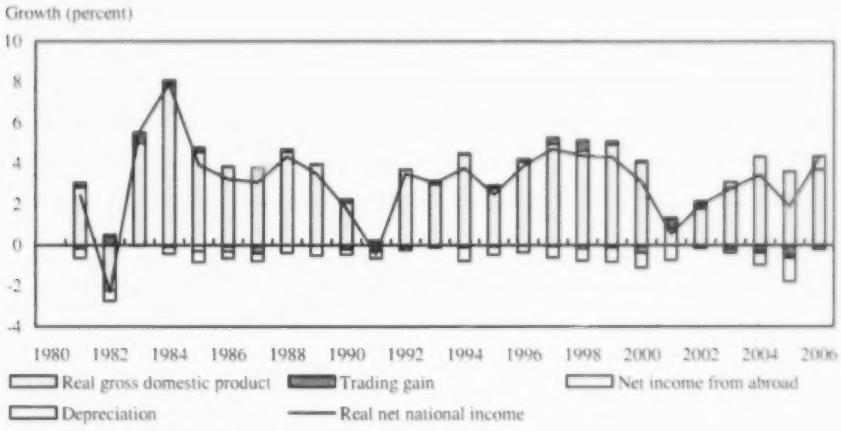
7. Real net national income is calculated using the capital consumption employed by the Bureau of Economic Analysis for calculating nominal net national product. It includes an adjustment for capital consumption allowance. The adjustment is particularly important at the end of the period, when changes in tax laws in the United States contributed importantly to the magnitude of the capital consumption that firms were able to write off. If the capital consumption adjustment is removed there is a larger negative impact in 2005 and a larger positive impact in 2006.

Figure 14
U.S. real gross national income growth



Note: Some results have been calculated by the author.
Source: Bureau of Economic Analysis, tables 1.15, 1.1.6, 1.4.4 and 1.7.5.

Figure 15
U.S. real net national income growth



Note: Some results have been calculated by the author.
Source: Bureau of Economic Analysis, tables 1.1.5, 1.1.6, 1.4.4 and 1.7.5.

4. *Per capita growth in Canada and the United States*

Of the last 27 years, the 2002-to-2006 period is unique because of the historically large, sustained real income growth in Canada from sources other than capital input, labour input or productivity growth. The impacts of trading gains, international investment income and capital consumption have contributed to a considerable divergence between real gross domestic product (GDP) growth measures and measures of real income that consider trading gains, international income flows and depreciation of the capital stock. Real income in the United States, on the other hand, has been largely unaffected by trading gains and international investment income.

As a result, when per capita real GDP growth is compared, Canada lags behind the United States due to a relative decline in productivity (Baldwin and Gu 2007). U.S. per capita real GDP outpaces Canadian per capita real GDP growth by 2.3 percentage points from 2002 to 2006, making it appear as though the standard of living in Canada is not rising as fast as the standard of living in the United States.

However, when trading gains are taken into account, Canadian per capita real income growth was larger than in the United States, reflecting the importance of trade for Canada. Canadian real gross domestic income (GDI) per capita increased by 12.3% from 2002 to 2006, while per capita gross national income (GNI) increased by 14.3%, roughly double the growth in per capita real GDP (Table 2). Going one step further and adjusting for capital consumption leads to Canadian per capita real net national income (NNI) growth of 15.6%.

Per capita real income gains in the United States were not affected in a similar fashion. Adjusting U.S. per capita real GDP growth for trading gains, net foreign investment and capital consumption lowers per capita growth from 2002 to 2006 by 1.1, 1.2 or 0.6 percentage point, respectively.

As a result, while Canadian real GDP per capita growth lagged behind that of the United States, U.S. real GDI, GNI and NNI growth lagged behind Canadian growth. Once trading gains are accounted for, the growth of per capita living standards in Canada has outpaced U.S. living standard growth by between 4.1 and 7.0 percentage points after 2002.

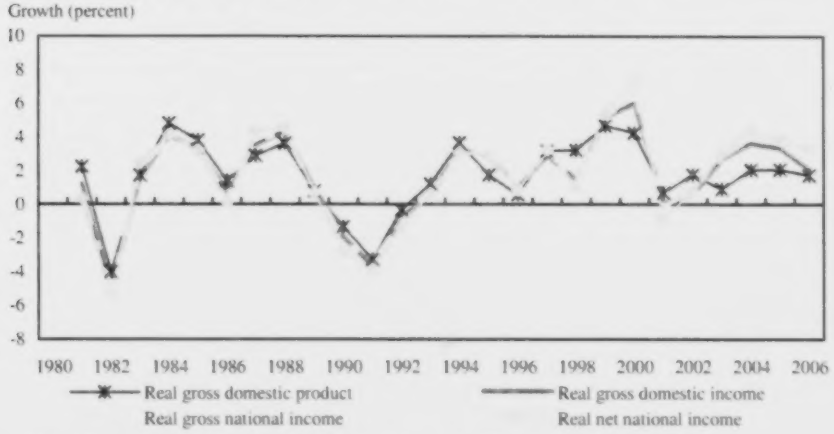
Table 2
Growth rates, 2002 to 2006

	Canada	United States	Difference (Canada–United States)
	percent		percentage points
Real gross domestic product per capita	7.0	9.3	-2.3
Real gross domestic income per capita	12.3	8.2	4.1
Real gross national income per capita	14.3	8.1	6.2
Real net national income per capita	15.6	8.6	7.0

Sources: Statistics Canada; Bureau of Economic Analysis.

The magnitude and direction of this gap from 2002 to 2006 is unusual. During the 1980s and most of the 1990s real GDP, GDI, GNI and NNI growth was similar in Canada (Figure 16). Trading gains had a smaller impact on Canada during this period. In the United States, the relationship was even closer (Figure 17). The only noticeable difference between real GDP and the trading gains adjusted income measures came at the end of the period and was primarily due to changes in capital consumption.

Figure 16
Canada per capita growth across income measures

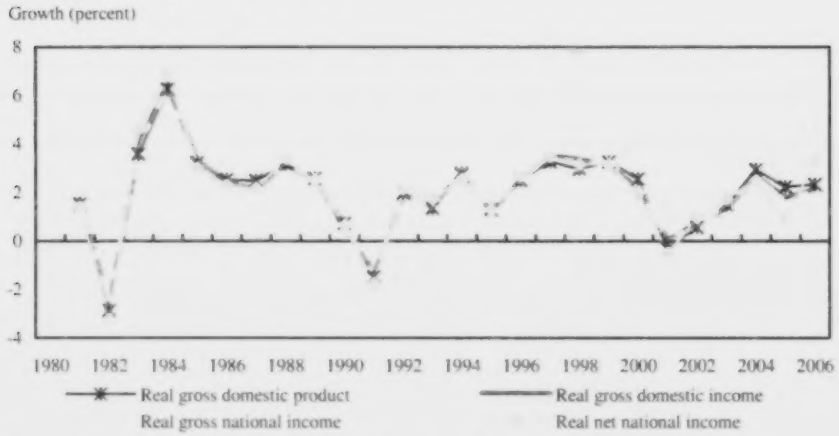


Note: Some results have been calculated by the author.
Source: Statistics Canada, CANSIM tables 051-0001, 380-0002 and 380-0030.

Despite having a lesser impact, trading gains still affected growth of per capita income in Canada during the 1980s and 1990s. However, unlike the post-2000 years, trading gains detracted from growth, worsening the performance of the Canadian economy relative to that of the United States during both decades (Table 3). During the earlier period, trading gains were negative, not positive, as the resource sector went into decline. Also, at the same time, the increase of the outflow of earnings often exceeded the increase of Canadian receipts of income from abroad. Canadian real GDP per capita increased 18.4% over the 1980s. Trading gains, net international investment income and depreciation reduced the various real income measures by between 2.7 and 3.3 percentage points below the growth rate in GDP. A similar drag on per capita real income growth is found in the 1990s when trading gains, net international investment income and depreciation reduced growth in real income measures below the GDP growth by between 1.7 and 3.0 percentage points. Per capita real income growth in the United States was minimally affected by these adjustments, making the relative performance of the United States during the 1980s and 1990s better using these alternative measures than when real GDP is used as the basis for comparison.

After 2000, and especially after 2002, real income in Canada rebounded sharply when trading gains are accounted for. While real GDP per capita kept pace with the United States, real GDI, GNI and NNI accelerated markedly. After 2000, the Canadian economy significantly outperforms that of the United States.

Figure 17
United States per capita growth across income measures



Note: Some results have been calculated by the author.
Source: Bureau of Economic Analysis, tables 1.1.5, 1.1.6, 1.4.4, 1.7.5 and 7.1.

Table 3
Per capita growth rates

	Canada				United States			
	Real gross domestic product	Real gross domestic income	Real gross national income	Real net national income	Real gross domestic product	Real gross domestic income	Real gross national income	Real net national income
	percent							
1980 to 1989	18.4	15.6	14.8	15.0	24.5	25.5	24.6	25.3
1990 to 1999	15.4	13.5	13.7	12.4	19.3	20.2	19.9	19.7
2000 to 2006	9.6	13.1	15.2	15.5	9.5	9.1	8.9	9.1
2002 to 2006	7.0	12.3	14.3	15.6	9.3	8.2	8.1	8.6

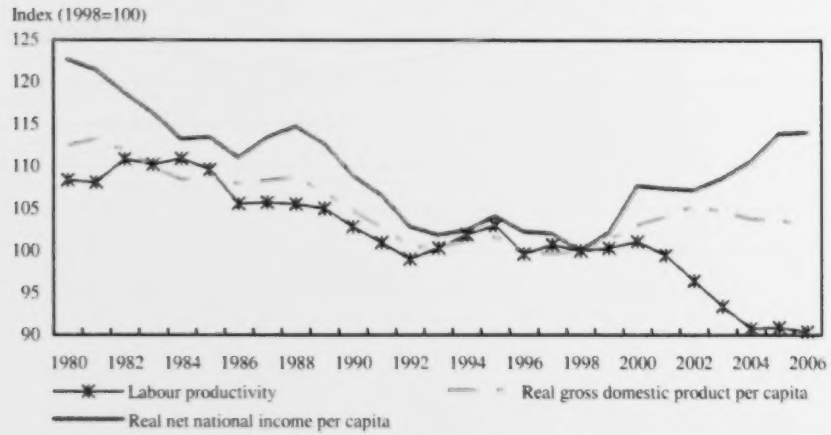
Sources: Statistics Canada; Bureau of Economic Analysis.

Canada's reversal of fortunes can be succinctly seen when the relative performance of Canadian and U.S. labour productivity is compared with relative real GDP per capita and real NNI per capita. Figure 18 plots the relative labour productivity between Canada and the United States from Baldwin and Gu (2007) against the relative performance of real GDP per capita and real NNI per capita. All series are indexed to 100 in 1998.

In real terms, the Canadian economy lagged behind the U.S. economy prior to 2000 as relative GDP per capita fell about 10 percentage points over the 1980s, levelled off in the 1990s and then increased slightly after 2000. Relative productivity also declined prior to 2000—falling in the 1980s, holding steady in the 1990s and then declining precipitously after 2000. The difference between GDP and productivity growth post 2000 occurred because the Canadian labour market was much more buoyant than the U.S. labour market. Hours worked per capita increased more rapidly that in the United States—driven by a much faster increase in number of jobs per capita (Maynard 2007).

Declining relative prices for commodities and the depreciation of the dollar took a further toll on Canada relative to the United States, leading to a more noticeable decline in real NNI during the 1980s. Prior to 1990, relative income fell more than relative GDP. The real income measure reveals an even greater gap in the performance of the two economies.

Figure 18
Canada–United States relative performance using different measures



Note: Some results have been calculated by the author.
Sources: Statistics Canada; Bureau of Economic Analysis.

Since 1998, and especially after 2002, the relative picture of the performance of Canadian economy using real NNI per capita has diverged substantially from the picture provided by the labour productivity and GDP per capita measures of performance. From 1990 to 2000, relative labour productivity and GDP per capita between Canada and the United States changed little. Canada's labour productivity began declining relative to that of the United States in 2000 and levelled off after 2004. Canadian relative real GDP per capita increased from 2000 to 2002 as the United States underwent a more severe slowdown than Canada. Once the U.S. economy emerged from that slowdown, its relative GDP per capita rose more quickly than GDP per capita in Canada.

Relative real NNI per capita remained fairly stable until 2002, after which improvements in Canada's terms of trade contribute markedly to relative income growth. The increased trading gains Canada experienced from 2002 to 2006 led to a better relative performance than labour productivity or GDP per capita statistics suggest. Moreover, Canada has also benefited from increased international investment flows that have further improved its per capita income relative to that of the United States. Contrary to the productivity implied drop in Canada's living standard relative to the United States, incorporating the impact of trading gains shows that Canada's relative living standard has improved dramatically.

5. *Conclusion*

The performance of the Canadian economy relative to its U.S. counterpart has received considerable attention from the analyst community. Most of the time, these evaluations make use of summary statistics like gross domestic product (GDP) or productivity (GDP per hour worked) to analyse differences in performance.

Both of these measures capture in succinct form the myriad of events that affect the domestic income that the economy is producing by transforming labour and capital into output. As such, they provide a useful summary of what is happening to the income that is being generated by domestic production.

Data from the National Accounts can also be used to evaluate other concepts of income—concepts that take into account changes in the potential purchasing power of income that occur from relative price shifts, the income that is being transmitted to or received from abroad because of international capital investment and because capital is consumed during the production process and must be replaced if standards of living are to be maintained. These measures are referred to, respectively, as gross domestic income (GDI), gross national income (GNI), and net national income (NNI).

These measures receive less attention than GDP-based measures. And for many purposes, GDP-based measures may be adequate—because the measures are often similar in the short run. However, ignoring differences in these measures can hide important trends and one could sometimes miss important changes in direction.

This paper demonstrates just how important divergences between these measures have been over the last 25 years—and how they can modify our interpretation of events.

In the period before 2000, all of the measures indicate a long-term decline in the relative performance of the Canadian economy—though the various modified income measures declined more than the GDP measures, especially in the 1980s. These were the years in which the resource economy in Canada was in decline. Resource inputs as a percentage of GDP were falling around the world. Relative commodity prices were declining. Canadians were increasingly remitting more abroad than they were receiving. As a result, the various income measures actually declined more than the measures of GDP.

All that has changed with the commodity boom that Canada has experienced after 2000. Prices of exports have increased dramatically, relative to the prices of imports. Canadian receipts of income from abroad have increased dramatically, relative to payments abroad. The concatenation of these events has led to a dramatic increase in real income growth in Canada, relative to its GDP growth. And this has also affected Canada–United States comparisons. Canada had a strong terms-of-trade improvement from 2002 to 2006 due to rising commodity prices, an appreciating currency and falling world prices for manufactured goods that contributed greatly to real income growth. The U.S. measures of real income were much less affected by trading gains.

As a result, comparisons of the relative per capita performance of the two countries hinges crucially on whether or not the terms of trade and international income flows are incorporated into the analysis. If the terms of trade are excluded, and relative real GDP per capita growth—or relative productivity growth—is the focus, then Canada appears to have been performing worse than the United States from 2002 to 2006. However, if the impact of the terms of trade, international income flows and depreciation are included in the analysis, then Canada fares much better. In fact, its growth outperformed that of the United States by as much as 7.0 percentage points from 2002 to 2006.

The long downward trend in Canada's fortunes has been reversed in very short order. In three years, real income levels have returned to the levels of the mid-1980s. Much of this has been due to the much maligned resource economy. Studies of the Canadian economy in the late 1990s often emphasized that the salvation of the Canadian economy lay in high-tech growth in the manufacturing sector—partly because of the high rates of growth in this sector in the United States, partly because the commodities provided by the resource sector seemed to be in secular decline.

The performance of the Canadian economy post 2000 has shown the advantages of having a diversified economy with a not-insignificant resource base. A diversified economy has some of the same advantages as a diversified stock portfolio: some sectors may decline slowly for long periods of time only to experience a dramatic change in fortunes. Canada has had just such an experience.

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